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THIS FIRING QUESTION*

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When our Secretary rang me up some short time back, and asked me to contribute something to an informal discussion by way of an opening, it occurred to me at once, inasmuch as most of the recent correspondence in the *Veterinary Record* that followed upon Dr. Fraser's notable article on the results obtained by the application of the cautery in tendon lameness among racehorses,† was contributed by members of the Royal Counties Division, that I need look no further for a subject for us to discuss at greater length.

In the light of that correspondence it seems wrong to have given it the editorial heading of "Firing Controversy." The admirably impartial tone of the writers concerned, on a topic that might well incite lesser spirits to acrimony and recrimination, deserves note, and I consider the little group of letters a model of how such opposing views should be put forward. Take a dip into the veterinary journals of 30 or 40 years ago, and you will soon observe what a difference there is in our professional outlook on debatable points of procedure, a change that has only taken a generation to come about. In fact it occurred to me, in re-reading the letters, that perhaps the only offender in this respect was myself, and that, in my anxiety to be concise, Dr. Fraser may have considered my letter to have been curt to the point of rudeness. If so, I apologise in advance for an unintentional impression of discourtesy.

The reasons for firing or not firing a horse may, as the textbooks put it, be conveniently divided into three groups, namely, Clinical, Psychological and Moral.

So far as clinical grounds are concerned, my experience in equine lameness is so much less than that of many present here, that it would be presumptive on my part to discuss the matter in detail. If I may be permitted to take the role of observer, then I gather that the main arguments of the pro-firing school are, first that the healing of the tendon is greatly accelerated by firing, when compared with other procedures, and second that the healed tendon is stronger than would otherwise be the case. Now, with great respect I would venture to suggest that if indeed this be true, then in the name of humanity it is high time that this school of thought produced more tangible evidence that these opinions are tenable. You will no doubt ask at once, what sort of evidence have I got in mind? It is along these lines. In modern industrial procedure it is customary before a component is manufactured to take steps to ensure that the material has undergone tests that reveal its ability to stand up to the job. There is nothing very abstruse in the method of testing a fabric or metal rod for its breaking point under a given type of strain. The figures can be found in textbooks for a vast range of different materials. So I cannot see any great difficulty in organising research to establish what is the average tearing point of, say, a two, four, or five-year-old thoroughbred tendon in its healthy fresh state. I visualise the enquirer taking a number of tendons at *post-mortem*, and subjecting portions, of selected cross sectional area, to gradually increasing tension, until at a given figure, read off on a spring balance scale, he observes rupture of the tendon fibres to occur. Let us assume that a figure for the standard average breaking point for healthy tendon is in our possession, and it is then at once possible for us by tensile tests with tendon previously treated and healed to establish the contention that this or the other mode of treatment leads to the best results. Frankly, I do not see how the claims of our contending parties can be adjudicated upon fairly, nor the modern demand for precision satisfied, until this is done.

In leaving you to talk out among yourselves the comparative benefits of the various lines of treatment that exist alongside the method of cautery, may I mention to you the value that I have heard given to the use of prolonged and patient massage. I understand that in certain parts of India, it is customary for a native groom to sit hour after hour at the feet of his patient and gently massage the tendon injury; a procedure that continues for many days on end. It is claimed that the result is a clean sound leg, free from blemish to eye or touch, and a strong or stronger tendon than before the strain occurred.

Now for the psychological urge that leads men on to cautery. As practical people who have a living to make we cannot ignore this aspect. It is impossible to overlook the fact that we are employed by an owner or trainer who has in his charge an animal of great money- or sport-making potentialities, incapacitated for the time being from carrying out one or other of these functions We feel it is up to us to produce

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†"Strained tendons and their treatment by firing." FRASER, A. C. (1940) *Vet. Rec.* **52.** 689-692.

from the hat a trick that will at once impress him by its effectiveness, prompt action, and lasting results. If at the same time our procedure reveals a certain element of showiness and technical exhibitionism, then indeed is the devil's broth well brewed for the blinding of conscience! It is our and the horse's misfortune that the technique of burning the skin with a red hot iron should possess all these diabolical temptations. I can only hope that the piece of research I have outlined to you may prove to those among you who are immune to the charge of showmanship, the fallibility of what after all is a quite honest opinion that cautery leads to the best results. I appreciate to the full that local anaesthesia and modern mild blisters have done much to lessen the suffering that accompanies a burn. But, ask any airman who has been burned whether the spell in hospital while healing is going on is a pleasurable period. May I, too, ask you to answer for yourselves this question: "Would you, having suffered a tendon tear, permit your doctor to fire and blister your limb?" My own answer is, "anything but that." If then I, or anyone else who thinks alike to me, fires a horse, how can we avoid the accusation of playing the devil's game? I leave it to some of you to put the opposing point of view.

Lastly, a word on the moral aspect, which cannot be altogether separated from the psychological one that I have touched on. I am not ashamed to draw your attention to what after all should be our first, as it is our highest, line of approach to solving this question. I recollect some years ago being greatly stirred and impressed by a passage in Moynihan's great work on abdominal surgery to the effect that he regarded himself and his surgical team, when they entered the operating theatre, as members of an order of priesthood, about to undertake part in a sacred ritual, for the relief of some tortured creature. I would put it to you, gentlemen, that however humble our role, we too are members of that priestly hierarchy dedicated to the relief and prevention of suffering, and in the light of this point of view to ask you to bear in mind that, in the words of a Great Master, "inasmuch as ye do it to the least of these little ones, ye do it unto Me."

. . . . .

Dr. A. C. Fraser, having complimented Mr. Hancock on the eloquence with which he had presented his point of view, said that it had come as a surprise to him to find that treatment by firing required defending. He had not written his paper with the object of raising a controversy, but since he had used and discussed the treatment he was prepared to support it until he was convinced that satisfactory results could be obtained by other and pleasanter means. The subject was apparently not dealt with extensively at the colleges, which may have been due to the fact that some of the teaching members did not approve of the method. Dr. Fraser agreed that research should be carried out on tendons and offered to co-operate with Mr. Hancock by supplying tendons from thoroughbred horses on which he might be called to make *post-mortem* examinations. He had no criticism to offer of Mr. Hancock's presentation of the psychological and moral aspect, his own object having always been to obtain the most satisfactory results as regards future performance with a minimum of suffering to the animal.

Dr. Fraser ended by saying that he hoped to learn during the afternoon what the opinion of other members was on this subject and what their experiences were in various treatments of strained tendons.

Mr. G. P. Male began by saying he was very much indebted to Mr. Hancock for his paper. He thought Mr. Hancock produced no proof whatever that firing was not of benefit to the horse: he appeared to consider all other aspects except this. He himself always carried out the operation of firing with the same seriousness as any other operation on an animal, in fact as a "High Priest" would, and did not treat it as a theatrical performance. It was the duty of the veterinary surgeon to advise the client and to do all he could to make the animal fit for useful work again. Mr. Male went on to say that he was doubtful whether any experiment on dead legs and dead tendons would be very satisfactory. Experiments on living tendons would be almost impossible. He commented on the Indian method of massage which Mr. Hancock had described. He thought it was easy in many cases to get clean legs after a strain, but immediately a horse was put to fast work he would break down again and possibly more badly than ever. If there were a rupture of tendon fibres there must be a strong fibrous union, otherwise the leg would not stand up to the strain of a fast gallop. Rather than be permanently lame and in pain he would prefer to be fired. Some doctors wished they could employ this method on their patients. Some had used the actual cautery for severe strains with success. The sum total of pain was thereby reduced.

Professor J. G. Wright said that he had been impressed by Mr. Hancock's opening paper. He was inclined to agree that the popularity of firing was due, in no small measure, to its spectacular nature; and also to a persistence of the old belief that the degree of benefit derived from any particular treatment was proportional to its severity. Firing was a very ancient, empirical practice. It was introduced long before there was any knowledge of the histological structure of tissues and the processes of inflammation. Little or nothing had been done to investigate the action of firing upon the tissues. He felt that in justice to Dr. Fraser and Mr. Male it should be stated that they carried out the operation with all surgical care and skill. It must be appreciated that sprain of one or more of the tendinous structures, with possibly the tendon sheaths, at the back of a horse's cannon, was a very serious injury; more serious, he thought, than a similar sprain in man. This was due in part to the histological nature of the tissues involved, and also to the fact that the horse had a single digit only, and thus all stresses were placed upon a single group of structures. Resolution must be slow. It was accepted that tissue rest was an essential factor in healing. The late Professor Macqueen taught that in the treatment of sprained tendons, rest, more rest and even more rest was necessary. Perfect rest, however, was difficult or even impossible to procure in the horse. The animal spent the greater part of its time on its feet. When it did go down, on rising again, it placed severe tension on the inflamed structures. Thus it was inevitable that healing would be slow. No firing was carried out for the treatment of two, etiologically and pathologically distinct, conditions: the first—sprain of such structures as the flexor tendons, and the second—that progressive ossification of the connective tissues in the region of the digit and hock which was described clinically as ringbone and spavin. What were the explanations given for its therapeutic effects? Dr. Fraser had stated, "Later treatment consists of stimulation of the area to induce the laying down of more fibrous tissue by the process of inflammation. This stimulation is brought about by liniments, blistering ointments, and by firing. The natural healing processes are thus hastened and their effects exaggerated. The animal is lame for a shorter period and the leg supported strongly to withstand the tension of further work."

This explanation was worthy of examination. By firing, linear destruction of the skin to a variable depth was provoked. This induced a considerable degree of vascular reaction in the skin and subcutaneous connective tissue, accompanied by swelling, heat and pain. As healing occurred the reaction subsided and a series of linear cicatrices developed in the skin. He (Professor Wright) did not accept that this provoked the laying down of mor and more fibrous

tissue in the connective tissue supporting the tendons and the tendon sheath. Were it to do so, he thought that the function of the tendon would be even more seriously interfered with. Nor did he believe that the linear cicatrices in the skin had a " supporting " effect on the tendons. He did concede, however, that during the period of vascular reaction provoked by the firing the tendon received a degree of mechanical support and also that the local pain indirectly compelled resting. The period was comparatively short, and he suggested that the same result might be brought about with less drastic treatment. With regard to the second condition—bony exostoses—in these firing appeared to him to be even less rational. Unfortunately we knew very little of their etiology or pathology (he was not satisfied that they were, in fact, inflammations) and explanations as to the action of the firing were more obscure. As he saw the matter, local areas of skin, connective tissue and bone were destroyed by the heat of the iron. By the grace of God these areas healed again. More than that could not be said.

Professor Wright ended by saying that in his opinion the exponents of firing had not made their case.

Professor Wooldridge said he could not compliment Mr. Hancock on his suggestions of experiments. He added that one must realise that dealing with animal tissues is very different from dealing with metal and things of that kind. Living tissues were very different from dead ones. He thought that such a series of experiments would look very well on paper but in the end it would not lead us anywhere.

Professor Wooldridge then pointed out that there was an economic as well as a moral aspect of the question. Horses were considered and generally accepted as beasts of burden, but the humane aspect must not be lost sight of. There were two types of condition for which firing was practised and they must be considered quite separately, namely, those affecting soft structures such as tendons and ligaments and those affecting bony tissues. In his view both conditions could be greatly benefited in many cases by the use of the actual cautery applied in a different manner and producing the desired result in quite a different way. Referring first to bone diseases, he considered that pain and lameness were due to inflammatory processes and often aggravated by stretching of the periosteum. In course of time the inflammation might subside and the periosteum adapt itself and lameness disappeared. But in so many cases this took a very long time during which a horse could not be worked—an uneconomic position. The inflammation was a process of repair and might be very tardy, but it could be definitely speeded up by deep pyropuncture while the pain might be, and often was in his view, reduced by puncturing the periosteum and relieving the tension. This latter relief could also have been obtained by performing periosteotomy, but this operation did not stimulate the process of repair and curtail the course of the primary condition. It followed, then, that the best results were obtained by pyropuncture in the acute or subacute and painful stage.

Professor Wooldridge then referred to firing strained tendons or joints. He would not recommend this in the acute stage but he would do so at a later stage when the pain had subsided, with the object of providing additional support to weakened structures and so reducing the danger of recurrence and rendering the horse more fit to carry out his particular type of work. The firing should be into the substance of but not through the skin and in the case of strained tendons extending well forward on to the cannon bone in order to produce a series of long cicatrices which, by contraction, afforded permanent support to weakened tendons and reduced the danger of recurrent strain. In the case of strained fetlocks a similar result was obtained by continuing the lines completely round the joint. The effect was certainly comparable with the application of strong bandages of support by a footballer to a previously strained ankle. He could from personal experience vouch for the efficacy of such a measure.

He definitely agreed that an anaesthetic should be used when firing was carried out, but unfortunately the effect was not very lasting and some subsequent pain was inevitable, though this could be considerably reduced in many cases by appropriate measures. A bad sprain was a serious injury and in his view " drastic injuries usually call for drastic treatment," but firing should only be resorted to in carefully selected cases and not in any and every form of lameness.

The Hon. Secretary read a letter from Mr. Brayley Reynolds, in which he referred to " This Firing Question " as a burning topic.

Whatever arguments were put forward by the " ayes " and " nays " that day, Mr. Reynolds prophesied that the question would still be unsolved. He presumed that the " nays " would elaborate the argument against firing along physiological lines, but it had always seemed to him that though one could not support the procedure by rational reasoning, one could not ignore results.

In conclusion, Mr. Reynolds said that there was much sound argument in Mr. G. P. Male's letter (*Vet. Rec.* **52**, 819), and he hoped that Mr. Male would elaborate some of his points.

In view of the lateness of the hour and black-out conditions, it was decided to postpone the discussion to the next meeting.

Adjourned Discussion*

When the discussion on Mr. Hancock's paper was resumed, at the meeting on January 31st, 1941, Mr. E. Brayley Reynolds, called on by the President, thanked him for the honour of being given the opportunity of re-opening the discussion on this important subject.

Living where he did, believing what he did and practising what he did, he had felt he would be doing less than his duty if he did not come and take his part in the discussion. He was pleased to hear that [as the President, in re-introducing the subject, had indicated] he was not tied to discussing the actual paper as presented by Mr. Hancock: so much had appeared in letters on the subject in the *Record* that he felt that, by referring to some of the matter contained in them, he would better be able to make some points he wished to do.

In one of these letters Mr. Hancock had said that he spoke as a member of the third generation of veterinary surgeons: so did he, and on his mother's side there was a human surgeon in the second generation back, but he had to confess that even this infusion had failed to bring enlightenment, according to some views, to him (the speaker). He would say straight away he was himself a strong believer in firing.

The first comment he would make was that in the correspondence he thought sufficient care had not been taken in the selection of cases in support of one side or the other of the discussion. In illustration of this point he remarked that it was very common to see a condition in two-year-old thoroughbreds which to naked-eye appearances and almost to the touch were cases of broken-down and bowed tendons. In reality the tendon was not sprained, there was some inflammation of it but more particularly of its sheath. If such cases were confined to steady exercise only, the condition in the majority of cases would completely clear by the following season without any treatment whatever. Such cases could bring no help to this particular discussion because exponents of either method of treatment would be able to claim a success. Similarly he thought the introduction of draught horses into the argument was not very helpful, for, in his experience with these animals, although one would have to admit that true spraining of the tendons could occur, it rarely did so. The condition usually present was an inflammation followed later by contraction, and one should always look lower down the limb for a possible cause. The so-called spraining of the check ligament accompanied by sidebone or ringbone was the most typical example.

* At the meeting of the Royal Counties. Division, N.V.M.A., held at Reading, January 31st, 1941.

Dr. Fraser had spoken of sprained tendons in thoroughbreds, mostly four-year-old and upwards, so it was evident he was referring to cases of true sprain, and it was to this he wished to confine himself.

Mr. Hancock had dealt with the subject under three headings: Clinical, Psychological and Moral. He would do the same.

Under the first heading he would deal at the outset with Cause. This again he would subdivide :—

1. *Conformation.*—He thought he could best convey most of what he wished to say on the great bearing conformation had upon spraining of a tendon by referring to what, from his experience, he now looked upon as a practical fact, namely, that if you looked at a horse whose tendons had withstood the strain of rigorous training over a number of years—certainly more years than the large majority did—you could see at once why it had done so: you were immediately struck by the outstandingly true conformation of its whole body and its perfect balance. He would name two such well-known horses although others could be quoted: Brown Jack and Lanson—the former running until he was ten years old, and the latter until 13 years old, and this over long distances, with all the more strenuous training that implied.

Conformation, too, must be taken note of in regard to deciding whether or not firing should be practised, both for the sake of the owner and of one's own reputation. If one considered tendon sprain had resulted principally from very faulty conformation then, in his view, it was inadvisable to resort to firing.

2. *Condition.*—Dr. Fraser, as he understood him, had referred to condition being a cause chiefly from the point of view that the animal had not done sufficient work to bring its tissues up to that state of fitness which would enable them to withstand the severe trial put upon them. With this, of course, he agreed, but he also had in his mind another phase of want of condition. In his experience, more particularly with flat-racers, it was in the autumn that tendon sprain was more frequently met with. The period of late summer and early autumn was a dangerous time, the time when horses' coats were breaking. Their general system underwent a change and they very easily lost their condition, becoming easily tired in their work—nothing was more conducive to straining than a state of tiredness, even in the very fit horse when tiring in a race—and the actual tissues themselves, including the tendons and ligaments, lost their condition.

3. *Injuries other than Sprain.*—Bruising over the region of the tendons, such as from a tight bandage string, a blow by the horse striking the limb when cast in its box or while at work, or from practically any cause which set up an inflammatory condition in this area, might, if neglected or unheeded, be a predisposing cause of sprain of the tendons. The inflammatory condition with the accompanying transudation of fluid into the tissues led to a weakening of the tendons by their fibres being separated, even if ever so slightly, from one another. To render this easily understandable he would remind them they had only to watch a saddler breaking hemp thread. To do this he untwisted it, when it easily separated, but when twisted up so that the fibres were close to one another it was practically unbreakable. He would like to stress this point because he thought it helped them both in regard to treatment and in understanding in what way firing acted beneficially.

Treatment.—As had rightly been said, the inflammation accompanied by effusion resulting from injury to the tissues was followed by the throwing out of inflammatory fibrous tissue which later shrunk, binding and strengthening the tendon fibres. Bearing in mind, however, what he had just said he thought the first aim should be to limit as far as possible the amount of this effusion into the tissues, and this was best done by applying level pressure from the very onset, immediately after the occurrence of the injury. Applications of Antiphlogistine, or similar preparations, for the first few days was no doubt beneficial, but he thought sufficient care was not observed in doing this. By smearing such an agent thickly on to the leg and afterwards covering with cotton wool and a stable bandage, as was customary, sufficiently precise and level pressure was not obtained; and again, while this was being done and also while washing the paste off when changing the application the tendons were without support for some considerable time and unwanted effusion occurred. The best method of application in his view was to spread the paste evenly on a piece of gamgee tissue of suitable size, cover it with a single layer of gauze and bind on with a fairly narrow cotton or linen surgical bandage. In this way quite level and firm pressure could be obtained, and when renewing no washing off was necessary, the layer of gauze bringing away practically all the dressing when the plaster was removed, and an already prepared fresh plaster could be bound on immediately. He did not think there was any benefit to be derived from applications of this kind after five or six days. From then on dry cotton wool and an old crepe bandage would suffice, and these should be maintained till such time as they could safely be left off with no tendency to puffing of the leg. This time would vary considerably according to the degree of the original injury. Many owners and trainers were very often impatient for some active treatment to be done, but undue haste in carrying this out lessened the chance of a satisfactory final repair.

In some cases, in which the injury had been comparatively slight, blistering or other local dressing, or even rest alone, would give satisfactory results, but in those cases in which the injury had been in any way severe he would always advise firing. He agreed that if the animal was entire and not of great value as a sire he would advise castration as the first important step towards a good result. He agreed with Mr. Irving that many horses when castrated grew bigger, but as against this, they were less heavily fleshed, particularly in front, and they were more easily trained, requiring less work—a fact worthy of the utmost consideration where "dicky" legs were concerned.

Beneficial Action of Firing.—1. By causing a very marked hyperaemia; 2. By the exertion of pressure.

1. It had been said during the discussion that the application of actual cautery caused an increased formation of inflammatory fibrous tissue in the tendons themselves, thus augmenting nature's line of repair. With this he did not agree, except of course in deep pin firing into the tendon itself, a method which he thought should be reserved for very particular cases only. There probably was a certain amount of fibrous tissue produced under the skin, and there certainly was some produced in the skin itself, which later contracted into scar or cicatricial tissue.

He considered that one way, if not the chief way, in which firing exerted a beneficial effect was by producing a very marked hyperaemia of the parts, and so greatly aiding and hastening repair. In support of this he would refer to another condition for which firing, in his experience, had proved itself far and away the best line of treatment. He referred to carpitis. Inflammation of the lower row of bones of the knee and the head of the cannon, usually of both knees, was very common indeed in two-year-old thoroughbreds—chiefly perhaps because of their working at such an early age—but predisposing factors probably were some nutritional deficiency in the bone tissue and some slight faulty conformation of the knees themselves or the lower parts of the limb, short upright pasterns or blocky feet. It could not be coincidence that a great majority of those point-fired in the autumn stood training the following year whereas those treated by blistering generally had a recurrence of the trouble: he was speaking from an experience of too great numbers for that, and, in addition, it was always the most severe cases that were fired. He could not see that there was any other explanation than that the pronounced hyperaemia resulting from the firing had brought about an increased nutrition and a development of more sound bone. The beneficial result obtained by firing for splints was probably another example of the same thing. He could not accept the suggestion that tension on the periosteum had much to do with the lameness from splints, and that pyro-puncture relieved this, for it was very common indeed to see yearling and two-year-old thoroughbreds with the most pronounced diffuse splints on the inner or outer

sides of the cannon bones and yet never exhibit any lameness. He would like to quote a recent case of splint lameness which showed the most beneficial effects from firing whereas blistering had had no effect. The animal was an aged, high-class steeplechase horse which was thought to have quite a good chance of winning The National. For two years an effort was made to train it for this race but splint development on one fore limb with great lameness had prevented this. When viewed from the front the leg had a definite wedge shape from the knee to half-way down the cannon. Several blisterings were tried each time but with no good result. Last spring he had deeply pin-fired this animal, and this jumping season not only had the horse remained quite sound and run in several long distance races but the affected cannon had resumed a quite normal shape.

2. He had a ready expressed his views on the beneficial effects derived from pressure in the early stages of the injury, and had by analogy tried to explain his idea as to how this was brought about. He thought exactly the same applied immediately following firing. The amount of skin in the cannon region being very limited and in the form of a tube, there was a limit to which it could be stretched by the intense inflammatory reaction set up by the firing; in consequence, he thought there must be a correspondingly great pressure exerted upon the buried tendinous structures.

When, at a later date, the treated leg had fined down and the animal was again in work it was claimed by some that the cicatrised skin acted as a beneficial support to the tendons, while others held that no such benefit was derived. He himself favoured the former view. It was certain that if the firing had been as severe as it should have been then there must be a large number of cicatricial thickenings in the skin along with some tendency to a general shrinkage of the latter as a result of destroyed tissue. To show how this support, even though slight, would tend to have a beneficial effect he thought he could not do better than call upon yet another analogy by referring to the so-called "cloths," or "Newmarket bandages" or "leggings" so commonly used in that town. They consisted of boxcloth cut to fit very accurately and with the correct amount of pressure when stitched around the leg between the knee and fetlock, extending over the tendons from just below the knee to about the middle of the back of the fetlock and slightly shorter in front. He thought they were in general use nowadays by most trainers, although formerly their common use by Newmarket trainers was a source of derision by trainers in other parts. He had known some when first coming to Newmarket to laugh at their use, but later become firm believers in their efficacy. He was a great believer in the benefit that could be obtained from their use in some cases, in animals that had so-called "fleshy" legs, in that inflamed condition of the tendons in two-year-olds to which he had referred at the commencement of his remarks and even in older horses in which some slight trouble in the tendons had already commenced. It was thought that they produced a beneficial effect by exerting a continuous level pressure and support and maintaining an even circulation. He held, rightly or wrongly, an additional view as to the manner in which they might exert some beneficial effect. If one observed closely the tendons from behind when a horse was walking or trotting it would be seen that as the limb was flexed they made an "S"-shaped bend and bulge at about their middle part. This was brought about by and at the junction of the check ligament to the deep tendon. On the extension of the limb the tendon appeared to straighten out with a sort of flick, which would, of course, be more accentuated at the gallop. He suggested that the presence of a "cloth" on the leg kept the tendon in a more even position and reduced this flick to a minimum. He thought the action of the fired skin over the tendons was practically analogous in every way to that of a "cloth."

Summing up the beneficial effects of firing, Mr. Brayley Reynolds said that such an intense inflammatory reaction under pressure could not be produced in any way except by firing; certainly not by blistering. It was said that it was empirical. It was empirical, but so was most of their knowledge before it was capable of scientific explanation. This was no reason why we should refrain from using it if it was effective. He had found on reference to a paper he had presented some ten years or so ago that he had written in regard to empiricism when referring to the knowledge of horse breeders: "Their knowledge in this respect stands second to none, and it is just as sound, and may I say, exclusive, as our own veterinary knowledge. Both are empirical in origin; they have been gradually evolved through past generations by the keenest and closest observation, and by experiment. Definite results and knowledge were arrived at long before a scientific explanation of them was possible. A more specific scientific knowledge has confirmed so precisely some of these results—some of them of the utmost importance—that one is left wondering at the keenness of the observation that led to the same findings."

At this point the speaker displayed some pictures taken in Mesopotamia showing how prevalent the practice was there. Firing, he asserted, had been in vogue for thousands of years, apparently being found as effective as some of us found it now. It might even have started in the Garden of Eden. These photographs were taken near to where that was reputed to have been.

He had not much to say on the psychology of firing. It had been said by one contributor that its popularity was due to its "spectacular nature"! Mr. Hancock had referred to the admirably impartial tone of the group of letters which had been written on this subject as a model of how such opposing views should be put forward. He had, however, in regard to the psychological aspect made the remark: "We feel it is up to us to produce from the hat a trick. . . . If at the same time our procedure reveals a certain element of showiness and technical exhibitionism, then indeed is the devil's broth well brewed for the blinding of conscience!"—and went on to speak of the technique of burning the skin with a red hot iron having all these "diabolical temptations." Did he (Mr. Hancock) not think that he was skating on terribly thin ice when he used these words?

As to the moral aspect, he would simply say he accepted in its entirety the intense sincerity of all that Mr. Hancock had said in regard to this aspect of the matter, but he would ask that the same sincerity of purpose should be allowed to those who held the opposite view.

Mr. Jack Willett said that he had come down from London that day to support Mr. Male and Dr. Fraser. In his 44 years in practice he had fired many horses, and in his opinion the good effects of firing arose from the absorption of exudate; it also acted as a natural bandage and afforded a long rest. The rest, he thought, was the most important; as many of the members knew, however, his practice was mostly concerned with large London firms, and in many cases if he were to recommend rest alone, without applying some line of treatment, his practice would begin to dwindle. In his time he confessed he had adopted firing as a treatment when it was not absolutely necessary, but neither blistering nor any other form of treatment would have ensured the necessary rest.

Mr. Willett concluded by saying that he did not desire to speak at length as he knew many others would wish to participate and the time was short: the object of his remarks was to vindicate the practical value of firing as a treatment.

Mr. Esmond Brown, of Bath, who, through indisposition, was unable to be present, contributed the following by letter: "I am keenly disappointed at missing the discussion on the firing question, and in my absence I ask you to submit a few remarks of mine to the meeting.

"If any should doubt my right to speak on the subject, let me explain that years ago I was a pretty good wielder of the hot iron, having come to that skill in a school where all weaklings perished during the preliminary course of twitch-holding.

"*Clinically*, I think firing was successful, though in some cases probably only in the same way as the Daylight Saving Act—it made people do what they might have done some other way but didn't. (Maybe that's psychology, but there must be three headings!)

"*Psychologically*, it was satisfactory to the veterinary surgeon and the owner. The horse's attitude was that there was nothing in the long lurid annals of his servitude which led him to expect anything better.

"*Morally*, what beats me is how a man, his hands purple, hot and reeking from the performance of castration, can turn round and come all over holy, humane and scriptural at the thought of firing. *He* would not like to be *fired!* Now somebody is going to jump up and say that by modern methods castration is a simple and almost painless operation. Well, if the Devil can quote Scripture for his purpose, just allow me one line of Byron :—

"'There's not a joy the world can give
like that it takes away.'"

Dr. A. C. Fraser thanked Capt. Brayley Reynolds for his informative remarks, and said that he was very glad to have had the opportunity of hearing his views.

Proceeding, Dr. Fraser observed that he asked permission at the last meeting to speak further on the subject of strained tendons, chiefly because he disagreed so heartily with Professor Wright on most of the points he raised during his speech. He would first like to discuss his final sentence : "The exponents of firing have not made their case." This remark changed the tone of the whole discussion. They were more or less amicably comparing treatments of strained tendons, but now they were asked to prove that firing was an essential component of the veterinary surgeon's repertoire. This was not quite a fair position. Firing had been an established technique for many many years, and it was they, the exponents of firing, who were upholders of the orthodox treatment, while it was the opponents of the method who should prove that they had a better remedy which would ensure a satisfactory performance at fast paces after a severe breakdown —a better remedy than the old-established, truly tried and remarkably efficient method of firing and blistering.

So far not one of the opponents of firing had mentioned from his own experience one single case of breakdown in a thoroughbred or hunter which he had treated successfully, and he challenged them to do so. He was not doing this in any spirit of bravado or state of disbelief. What he wanted to know was that there were veterinary surgeons who could obtain fairly consistent results, in such cases as they had been discussing, without the use of the firing iron. He could himself produce cases which he had treated after tendon strain—though not severe cases—with successful results without resort to the irons, but these were selected cases which he had considered did not need firing. What he wanted to know was, could cures be obtained in a long series of cases without firing ?

He had been disappointed by the vague terms in which the non-firers had described their alternative remedies. He agreed that in mild cases of strain, hand rubbing, bandaging, long rest, liniments and salt water treatment might be satisfactory, but to give no further assistance than was included in this list to an animal that was so badly broken down that he was walking on the back of his fetlock joint was unqualified cruelty—and to shoot him, except in certain circumstances, might be an admission of professional incapacity or ignorance, when by an immediate local anaesthetic and drastic stimulant treatment such a case could often be completely cured with the avoidance of nearly all pain.

The test of the efficiency of a treatment was not the appearance of the leg but its performance. He had seen a number of horses put right for sale by one or other of the milder treatments, and bought, very often in spite of warnings, because the legs "looked all right" or even "looked nearly all right," only to break down on being put into strong work and come in for treatment by firing.

He was not a believer in the theory that the firing lines acted as a support to the tendons, though Mr. Brayley Reynolds had shaken his convictions here. Nowadays, he usually fired strained tendons by pyro-puncture actually into the substance of the tendon, and he found he got a greater reaction and very satisfactory results. There was, in many cases, especially where the original trouble had included a skin wound—as in section of the tendons through overreach—a laying down in and around the tendon of enormous quantities of what he had always assumed to be fibrous tissue. This fibrous mass did not seem to interfere with the smooth functioning of the tendon, except to the slight extent that followed all breakdowns—which was indicated by the fact that horses that had broken down on the flat did not very often return to flat racing.

Professor Wright had confined most of his remarks to general terms of pathology which did not seem to be based on actual observation of fired horses, as he appeared to imply that firing caused no actual reaction in the substance of the tendon but only in the skin and subcutaneous tissues. His own opinion was that there was a marked reaction in the tendon itself, which became very much enlarged, and he imagined that, for a time, this comparatively avascular organ became extremely vascular. However, they were all agreed on one point—that the pathological anatomy of strained tendons had not been investigated sufficiently for their discussion of it to be based on facts : and it was facts that they required.

Professor Wright had given a clear exposition of the process of firing in exostosis cases. He had said that skin, connective tissue and bone were destroyed by the heat of the iron and that the area healed again. He did not continue and say that the condition for which the treatment was applied was thereby usually cured. He (the speaker) should continue to expect recoveries using pyro-puncture. He did not know how it worked, but he did know that it did work ; he proposed, therefore, to go on using established treatments, the results of which he found to be satisfactory, even though he did not pretend to understand them—in the same way that they all used many drugs without having the slightest idea how they achieved the results which they had learned to expect from them. They were far from the state of perfect knowledge that Mr. Catmur desired so ardently.

One of the less pleasant points put forward by the non-firers was that of exhibitionism. That was a very difficult subject to discuss impartially, so he did not propose to be impartial. He himself was proud of his firing technique and was delighted when the treatment was completed and the animal returned to full work with the neat pattern of his points or lines lightly covered by the growth of new hair : and he was equally disappointed when blemishing had occurred and the pattern was spoiled by scarring. He was, however, also proud of his professional reputation and he did not recommend firing for the satisfaction he derived from seeing a job well done.

There was another angle on this question. Those opponents of firing who had not had experience of the use of the firing iron were subjected to the temptations of selfishness and pride, and were guilty of cruelty if they withheld from a seriously injured animal a remedy which would shorten that animal's period of suffering and would lead to a recovery more satisfactory and more permanent than that brought about by the remedy which they actually prescribed.

He would say, in conclusion, that the best proof that could possibly be obtained that firing was necessary and satisfactory was the list of names, few but eminent, of practitioners who were widely experienced in horse practice and who had spoken or written in favour of this method of treatment.

Mr. G. P. Male said he had great sympathy with those who, for aesthetic or other reasons, preferred not to use firing as a treatment in the same way that some practitioners preferred not to castrate or perform any other operation, but he had no sympathy with those who vaguely and theoretically discussed the matter without practical knowledge or experience behind them. He also objected to Professor Wright's final statement, *viz.*, "As he saw the matter, local areas of skin, connective tissue and bone were destroyed by the heat of the iron. By the grace of God, these areas healed again. More than that could not be said." This was very drastic and not borne out by his previous remarks.

Before venturing to criticise and in order to be in a position to assess the value of firing, one must see the horse

from the beginning, try various treatments, and when they had failed then resort to firing and see the result. This must be carried out in a great number of cases before one was in a position to say whether or not firing is effective. He had tried to find reasons for this opposition, and judging from some of the correspondence on the subject he could only think that some of the critics must have had unfortunate experiences following the operation; such sequelae as sloughing, septicaemia and tetanus should not happen. In his contention these sequelae could only have been due to faulty technique, and he thought that recent graduates had not received sufficient instruction on the technique of firing, and text-books did not supply the information. He thought it would therefore be beneficial to say something about technique and dangers to be avoided. As was the case in any operation, one must undertake it in a rational manner and provided with the proper instruments. One would not attempt a median neurectomy with a carving knife.

First of all, the skin must be healthy and clean. It was unwise to apply a firing iron to a skin that had been thickened and inflamed by the application of strong liniments or hot applications.

Secondly, one must have the proper instruments. He had seen some firing irons much too cumbersome and heavy, which could be more correctly termed implements. Irons must be light, neither too sharp nor too blunt, properly curved and used neither too hot nor too cold. One must go down the lines quickly and lightly and back again, perhaps a dozen times, so that the skin was not scorched between the lines. The lines must neither be too far apart nor too close together: if too close, they might slough into each other—also if the lines intersected this might ensue as the result of the blood supply being cut off from the skin in the area between the intersections.

The skin varied in thickness, and this should be judged very carefully: one must not penetrate the skin in line firing, though it was correct to do this in point firing.

After firing the leg should be protected by a bandage before allowing the horse to rise (he usually used a general anaesthetic). After that the leg should be blistered lightly with a non-irritating blister of proper strength. The horse, after the operation, should be allowed to walk about and eat hay out of a net, otherwise he would fret and chafing of the fired limb was more likely to occur. He should not be tied up. The after-treatment was most important; sedative and astringent lotions and powders should be applied, not ointments.

(Here Mr. Male had to conclude his remarks.)

Mr. Hancock said that he had learnt a great deal from the discussion which had taken place that afternoon. He commented on the friendly atmosphere in which the discussion had been conducted and said that with two sides holding such opposite views acrimony might very easily have crept in. From the great volume of correspondence in *The Veterinary Record* it was evident that there were two schools of thought, namely, those in favour of firing and those who were opposed to it. It seemed that those who were in favour of firing were for the most part engaged in practice amongst the faster-moving animals such as race horses and hunters, and they claimed that in certain conditions firing was necessary; none of them, however, to his mind, had made it clear what these conditions were. Some years ago he himself had suffered an agonising pain in his leg. His doctor told him that the pain was due to a displaced cartilage and advised him to wear an elastic knee bandage. As long as he wore this bandage he was able to carry on, and even play tennis, without experiencing any pain. He found quite by accident on one occasion when the bandage had slipped down on to his calf that he still experienced no pain, although if he removed the bandage altogether the pain returned. His explanation of this phenomenon was that in some way the pressure exerted on his calf by the bandage brought about a reminder or warning to the inflamed area in the nature of a reflex, and by redistribution of strain prevented pain or further strain to the cartilage of his knee. He thought that it was possible that the pressure induced by the cicatrices after firing might operate in a similar manner.

With due respect to his old teacher—who he was afraid had damned his suggestions about tensile test with less than faint praise—he was still of the opinion that useful information might be gleaned from such tensile tests on tendon tissue as well as from macroscopic and microscopic examination of tendons which had undergone various treatments. If the exact nature of the changes brought about in the tendon by firing could be ascertained, it was possible that some less drastic method of bringing such changes about might be found. With regard to the Newmarket boot referred to by Mr. Brayley Reynolds, he thought that possibly its good effects worked on similar lines to the elastic bandage on his own knee already referred to.

Mr. Hancock then read a letter from Mr. J. C. Coleman expressing himself as being in agreement with his anti-firing views, and concluded by saying that Mr. G. P. Male and the other exponents of firing would be glad to know that a contribution would shortly appear in the *Record* from Sir Arthur Olver strongly supporting their pro-firing opinions.

Professor Wright thanked the President for inviting him to speak again, particularly as some of his remarks had been criticised by previous speakers. He said he was pleased to hear the views of Mr. Brayley Reynolds on the subject, some of which bore out his own statements. He commented on the fact that some of his critics did not appear to have re-read the report of the discussion so far. In the course of his previous remarks he had questioned the explanation given for the action, but had conceded that during the period of vascular reaction provoked by firing the swelling served as a mechanical support and the pain provided rest. Mr. Brayley Reynolds called it pressure, but the speaker thought that he (Mr. Reynolds) would admit that this period was a short one, lasting from 14 to 21 days at the outside.

Professor Wright considered that the aetiology and pathology of tendon sprain were so different from that of ringbone and splint that the same explanation of the action of firing could not be applied to both. He did not accept that pain in the latter conditions was due to stretching of the periosteum; in fact, there were many specimens in the museum of the Royal Veterinary College which showed that the new bone developed outside the periosteum, and thus he could not agree that benefit resulted from penetrating the periosteum with the firing iron. He mentioned that he believed that Professor Mitchell, of Edinburgh, was carrying out research into the aetiology of these bony diseases of the limbs and expressed the hope that something would come of it.

Professor Wooldridge disagreed entirely with Professor Wright's suggestion that because two conditions had different aetiology similar treatment could not benefit both. To him there was nothing peculiar in that, and numerous examples could be cited. Professor Wooldridge was convinced that cicatrical contraction following the operation of line firing did give support to the tendons. He instanced the contraction of those cicatrices which sometimes followed the healing of badly cracked heel, to such an extent that the heel was kept permanently raised from the ground; he also mentioned the contraction which sometimes occurred in tendons following healing. Line firing gave a series of lines of support equal to the support afforded by a moderately tight bandage—particularly when the lines were continued well forward on to the side of the cannon bone.

The President (Mr. Barron) now indicated that, at this juncture, the discussion must terminate. He cordially thanked all those who had taken part in it.

Weekly Wisdom

He was for ever deciphering the huge horoscope of life, yet getting no further than the House of Wonder, on whose cusp surely he had been born.—Algernon Blackwood: "The Centaur."

THE VETERINARY RECORD

May 10th, 1941.

THIS FIRING QUESTION

IN the columns of recent issues of *The Veterinary Record* the value of the application of cautery in the treatment of strained tendons in the horse has been the subject of sustained controversy which has terminated at meetings of the Royal Counties Division in the lively discussion of the topic which, with the paper on the subject, is published elsewhere in this issue. The controversy is not new. The subject has been under discussion for more than one generation, and the practice of firing has been in operation as long as the practice of veterinary surgery. In the discussion it would appear that two issues have been confused, (*i*) the comparative value of this method of treatment, and (*ii*) its method of action. Regarding the first point, one cannot but be impressed by the extensive experience of veterinary surgeons of high repute who took part in the discussion and claimed that in certain cases no other treatment gave such satisfactory results. The assertion that no explanation of the action of cautery is entirely convincing cannot be said in any way to invalidate the observations on the value of firing. To state that a form of treatment is empirical is no argument against its therapeutic value. Many therapeutical forms of treatment are in vogue and have proved their worth and yet have not, at least in the first instance, been capable of scientific explanation. No one would, therefore, on that account refrain from adopting these measures if they give the required results more efficiently than any other available method.

To make a scientific experiment into the various therapeutic measures against strained tendons, it would be necessary to provide a number of animals with the same degree of the affection, treat some by firing and use an adequate number as controls. That experiment is not capable of realisation. But the nearest approach to it have been the numerous observations on cases in which other measures have proved inadequate and in which firing has been adopted with success, although here the time factor confuses the issue in the opinion of many.

As with other therapeutic measures, the selection of cases to be treated by firing has to be made with care, and experience alone can be the guide. It was advanced at the R.C.V.M.A. meeting that the test of the efficiency of a treatment is not the appearance of the leg but its subsequent performance. It was stated that a number of horses had been restored to usefulness by one or other of the milder treatments, only to break down on being put to strong work and come in for treatment by firing, and that firing might have lost repute in some quarters because of its indiscriminate use and want of skill in its application. This of course is no argument against its value in skilled hands for selected cases. The treatment is especially useful in badly sprained tendons in thoroughbreds and fast-working horses, and even in cart-horses it has seemed to some to be of value where there are no other lesions and after the primary inflammatory phenomena have subsided.

As stated in the discussion, firing has been an established technique for many years, and it was for the opposers of the method to prove that they had a remedy which would ensure a more satisfactory performance at fast paces after a severe breakdown than the old fashioned, truly tried and remarkably efficient method of firing and blistering. Such evidence as has been made available is apparently less voluminous and not so well supported by case histories over a period.

The second consideration, the method of operation of the remedy, is not so easy of satisfactory explanation. It is true that the treatment ensures prolonged rest and with it the opportunity of natural repair, but that does not seem to explain sufficiently the *modus operandi* of firing.

In sprain of the tendons the changes which occur include damage to and rupture of some of the strands of white fibres in the tendon, together with rupture of some neighbouring vessels and some haemorrhage. This is followed by inflammatory reaction with effusion of exudate into the neighbouring tissues. Around and within the affected tendon the fibres of the area will thus be separated. In due course the effusion is absorbed and new fibrous tissue is laid down to replace the effusion and the damaged fibres which have been removed. But where the damage is great the reparative process is not complete or entirely satisfactory. With firing there is a moderate destruction of tissue and a rapid development of a new inflammatory process with exudation into the subcutaneous tissue. This process soon subsides and is followed by scar formation of a moderate nature. It has been taken that the contraction of the cicatricial tissue in the skin may act as a support to the underlying tendons. This support has been compared with the application of a bandage over the tendons. But that does not appear to be a complete explanation even if it is more than a subsidiary one. One is therefore driven to the conclusion that changes are induced in the tendon itself which result in an increase in the density and the strengthening of the fibrous tissue which goes to the make up of the tendon structure. These considerations, however, are entirely theoretical, and would require to be supported by actual pathological examination, but it must be concluded for the present that extensive clinical experience, apart altogether from these speculations, agrees that firing is the most serviceable form of treatment in selected cases of sprained tendons in horses.

We may, however, still hope that research will yet establish the true nature of these tissue repairs that take place in severed tendon tissue so that we may compare the natural with the treated repair at the end of the healing process. Humane considerations cry out that this be done, for if the claims of the pro-firing school, which for the time being appear paramount, are not supported by histological and other evidence, we may yet have to acknowledge that another Goliath of empiricism has been slain by a David of fact. Nor is it impossible that other less primitive methods that lead to the end desired by us all will arise, when our knowledge has been rendered more complete, and so abolish a technique that, to so many of us, savours of mediaeval barbarity.

CLINICAL COMMUNICATION

Incomplete Inguinal Cryptorchidism

J. P. ALLEN POTTS, M.R.C.V.S.,
BISHOP AUCKLAND

Subject.—A four-year-old Shire gelding.

History.—The owner bred the horse and had him castrated as a yearling; he was certain that both testicles had been removed. The gelding, however, showed every sign of being a typical rig, was half-broken and could be handled only by the owner.

Examination.—On palpation of the inguinal region, a firm swelling could be felt with difficulty on the near side. Examination *per rectum* revealed no sign of a retained testicle. A tentative diagnosis was made that the horse had been imperfectly cut as a yearling. In the light of the available evidence, there seemed to be no possibility that the horse was a true cryptorchid.

The horse being practically useless as he was, operation was decided upon.

Operation.—The horse was starved for 24 hours, cast with a single rope (side lines) and secured in the dorsal position with the hocks well flexed and abducted. The inguinal region was cleansed with ether soap solution, then painted with strong tincture of iodine.

Chloroform anaesthesia having been induced, an incision 5 inches in length was made in the left scrotal region parallel to the median raphé. The hand was then passed *via* the external inguinal ring into the inguinal space. The firm swelling, already palpated, was located; it was the size of a hen's egg and had formed strong adhesions which were difficult to break down. This growth was attached to an apparently normal spermatic cord. The emasculator was adjusted as far up the cord as possible and the growth removed. There was no haemorrhage. The wound was dressed with antiseptic oils and left open. The horse made an uneventful recovery and showed no further signs of cryptorchidism.

Observations.—The growth was firm, hard, and quite vascular. It would appear from the history and operation that my tentative diagnosis was correct, part of the gland having been retained after castration. Further questioning of the owner elicited the fact that the horse had been cut standing, and had been fractious. The portion of gland retained proved to be as troublesome in its effects on the character of the horse as complete cryptorchidism.

POULTRY STOCK REDUCTION

The absurdity of the position is that whereas through Government decree the expert has been obliged to dispose of 80 per cent. of his stock, the birds which he sells are bought up by "back-yarders," most of whom are beginners at the game, and who obtain a ration on a more generous scale than the vendor. Surely there is something wrong in this principle. Why should our best breeders be compelled to shed stock wholesale to provide material for novices? Would it not be a wiser policy from every point of view to cut down the back-yarders' allocation drastically and transfer the material to the commercial side when it would be used to much better advantage and for the benefit of the community as a whole?—*Scottish Farmer.*

ABSTRACTS

[VETERINARY MEAT AND FOOD INSPECTION IN SWEDEN. SANDBERG, I. (1939.) *Z. Fleisch-u. Milchhyg.* **50.** 7-9.]

The large towns in Sweden have public slaughterhouses, and any town with a population of over 4,000 must have its meat inspector. There are 170 meat inspection control stations in the country where meat is inspected and stamped, all being under the authority of the Department of Agriculture. The article gives tables showing the number of the various types of animals slaughtered in the abattoirs, most condemnations being due to tuberculosis.

Under the 1936 Regulations, milk and cream are controlled, cows, cowsheds and dairies inspected, and there is a medical inspection of personnel handling milk. Under the Pasteurisation Order of 1939, all milk and cream from other than tuberculin-tested herds must be pasteurised prior to sale for human consumption, whilst standards of cleanliness and structural standards are laid down for buildings.

Fish, game and poultry are also subjected to inspection. Laboratories are provided in the large towns, and the whole is under the control of the Department of Agriculture. It is stated that since the inception of the various orders and regulations for inspection of meat and milk, human infection from animal sources has diminished considerably.

D. J. A.

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[DIRECTIONS FOR THE ASCORBIC ACID THERAPY OF SLOW-BREEDING BULLS. PHILLIPS, P. H. (1940.) *J. Amer. vet. med. Ass.* **97.** 165.]

The author uses a concentration of 1 to 2 gm. of ascorbic acid in a sterilised buffer solution containing 0·1 gm. of monobasic potassium phosphate and 0·4 gm. of sodium phosphate in 50 c.c. of redistilled water. This is injected subcutaneously at three to four day intervals in doses of 1 gm. per 454 kg. (15·4 gr. per 1,000 lb.) for periods up to six weeks. He reports successes in the treatment of impotence in young or over-used older bulls.

D. W. B. T.

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[BRUCELLOSIS IN HORSES. A STUDY OF FIVE CASES WITHOUT CLINICAL SYMPTOMS. KARLSON, A. G., and BOYD, W. L. (1940.) *J. Amer. vet. med. Ass.* **97.** 576.]

Five horses, each with an agglutination titre to *Br. abortus* of 1/1,000, were studied over a period of several months. Although free from clinical manifestations of brucellosis at the commencement of the observations, one developed an abscess of the withers from which *Br. abortus* was isolated, while the organism was also recovered from a lesion in the sternum of another, and from lesions in the ribs of a third animal. The remaining two showed no lesions at autopsy, and *Br. abortus* was not isolated, although the organism had been recovered from the faeces of both during life. The authors conclude that such animals, by passing *Brucella* in their faeces, become a possible source of infection for cattle.

A. W. T.

[RECOVERY OF CARBON MONOXIDE POISONED RATS AFTER X-RAY TREATMENT. Cameron, J. A. (1939.) *Proc. Soc. Exp. Biol. Med.* **42**. 29-30. (2 refs.).]

A number of experiments were conducted to test the therapeutic value of X-rays in cases of carbon monoxide poisoning. One experimental rat and one control were used in each observation. Both animals were placed in a chamber and carbon monoxide admitted. When breathing stopped both were removed and laid on their backs. Exposures to X-rays of five to ten minutes' duration were then made on the experimental animal. The Victor machine used supplied 123 r. per minute with no filter except two sheets of paper towelling, running at 165 k.v.p. on a tube current of 4 ma., and at 12 inches target distance. In all, experiments were performed on 41 pairs of rats. In three cases both animals recovered, and in 21 cases both succumbed. In all other cases the X-rayed rat recovered, and the control died. This was in spite of the fact that the least promising subject was always chosen for X-ray exposure. In five of the cases, the rat was able to rise to its feet by the time exposure was complete.

D. D. O.

REPORT

[THE REPORT OF THE COUNTY ANALYST, LANCASHIRE, 1939.]

One is annually amazed at the number and variety of samples of food, drugs and other things examined by the authorities in this county and further surprised by the small proportion of adulterations recorded. Perhaps such suspicion of knavery is unfair, but considering the opportunities provided by manufacturing processes and the complexity of distribution, the low figure of 3·6 per cent. of 4,775 samples is gratifying.

Of this number 3,029 were milk samples, 157 being below the required standard. The fact that unadulterated milk may be below the minimum standard set by law, namely, 3·0 per cent. fat and 8·5 per cent. solids not fat (S.N.F.), is at last recognised and emphasised in this report. Both these figures are generally exceeded, the average over the number of samples examined being 3·69 per cent. fat and 8·78 S.N.F. Figures relating to nearly 2,000 examinations show that evening milk is richer in fat than is morning milk. These show an average of 3·58 per cent. in the case of the former and 3·95 in the latter case. The S.N.F. are not affected.

Though these facts have been known for some time the milk producer has none the less frequently been the subject of unjust criticism. By the system of " appeal to the cow " sampling and the more general application of the freezing point test, the position has been greatly improved of late. The definition of a genuine milk is now not one having 8·5 per cent. or more S.N.F., but one which has a freezing point depression within the range of 0·53 C. to about 0·55 C.

An additional point of interest to veterinarians in this report is in connection with water supplies contaminated with lead. Soft waters, more especially if they come from peaty moorland, are more acid than harder waters and more likely to take up lead along their course. With an alkalinity, expressed as calcium carbonate, of not less than 3·0 parts per 100,000 this does not take place. N. S. B.

IN PARLIAMENT

The following questions and answers are among those recently recorded in the House of Commons:—

Animals (Protection)

Mr. Price asked the Home Secretary whether he is aware that the grant of £1,000 and £1,500 for equipment is entirely inadequate for the efficient operation of the committee set up to deal with air-raid protection for livestock; and whether, in view of the fact that this organisation comprises 1,500 veterinary surgeons and 10,000 assistants drawn from the agricultural community and general public in all parts of the country, he can arrange for more adequate support for the working of this body?

Mr. H. Morrison: I regret that I am not in a position to add anything to the answer which my hon. Friend the Joint Parliamentary Secretary gave to a Question by my hon. Friend the Member for Stourbridge (Mr. R. Morgan) on April 2nd last.*

Mr. Price: Will the right hon. Gentleman bear in mind that this is a very important service in connection with the livestock industry and that, if more money is not available than has been afforded up to now, there will be complete inefficiency in the matter of dealing with the protection of livestock?

Mr. Morrison: I will keep that point in mind. We are in consultation with the Ministry of Agriculture on the matter, and their views must be taken into account.

Vet. Rec. **53**. 222.

Dairy Herds

Mr. Higgs asked the Minister of Agriculture whether he is aware that, owing to the improved price paid for corn and the lack of encouragement given to the dairy farmer, a large number of important milk producers are selling their herds and going out of production; and does he intend to take any action in the matter?

The Minister of Agriculture (Mr. R. S. Hudson): Substantial encouragement is being given to dairy farmers both in the matter of milk prices, and in preferential treatment for rations of feeding-stuffs. The culling of poor yielders from the dairy herd is desirable in the national interest in order that the limited supplies of feeding-stuffs may be used to the best advantage. I am not aware, however, that a large number of important milk producers are giving up their herds, but if my hon. Friend will give me particulars I shall be happy to have inquiries made.

Mr. Price: Will my right hon. Friend reconsider the advisability of encouraging the reduction of herds, in view of the fact that it is possible now to retain existing herds and also to increase the output of human food by an effective method of culling?

Mr. Hudson: There is a certain number of herds which are such poor yielders that in the national interest it would be better to slaughter them and have the available foodstuffs spread over the rest. The result of this might well be on balance, not a decrease in milk production, but an increase.

Sheep Diseases (Vaccines and Sera)

Mr. Robertson asked the Minister of Agriculture what steps have been taken to provide sheep farmers with a supply of vaccines and serums against sheep illnesses at reduced prices; and with what result?

Mr. T. Williams: My hon. Friend may be aware of the arrangements under which vaccines and sera are supplied at reduced prices in Scotland to members of the Animal Diseases Research Association and in North-East England to subscribers to the Alan Duke of

Northumberland Memorial Fund. On the recommendation of the Sheep Diseases Committee of the Agricultural Research Council, endorsed by the Council, discussions at which trade representatives were present were initiated by the Ministry towards the end of last year with the object of securing the introduction, on a wider basis, of a scheme for the supply of vaccines and sera at reduced prices. So far, however, it has proved impracticable to devise arrangements acceptable to all interested parties, but the question is still under active consideration.

Mr. ROBERTSON: Who are the interested parties who are holding this up?

Mr. WILLIAMS: The meetings referred to were attended by representatives of the trade, of the Agricultural Research Council and of both agricultural Departments.

Mr. ROBERTSON: Is it not a fact that the drug houses, which are making very substantial profits on vaccines, are the sole cause of the holding-up of this important work, and will the hon. Gentleman take steps to see that their resistance is broken down immediately and vaccines brought within the reach of farmers who cannot afford to buy them?

Mr. WILLIAMS: That is another question.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

May 13th.—R.C.V.S. Animal Management Examination begins.
May 14th.—Meeting of the Lancashire Veterinary Association at Liverpool, 2.30 p.m.
June 9th.—D.V.S.M. Examination at Glasgow Veterinary College.
June 19th.—R.C.V.S. Annual General Meeting, Royal Station Hotel, York.
June 20th.—R.C.V.S. Committee and Council Meetings, Royal Station Hotel, York.
June 26th.—R.C.V.S. Written Examination begins.
June 30th.—R.C.V.S. Oral and Practical Examination begins.

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The Recommendations of the Survey Committee for the Control and Treatment of Infertility and Mastitis in Bovines

The recommendations published in the supplement to this week's issue of *The Veterinary Record* are based on the evidence furnished by those most experienced in the control and treatment of the above diseases: they are approved by the Survey Committee of the National Veterinary Medical Association and form part of the service which the Association is giving to its members to enable them to contribute more efficiently to the national effort and well-being at the present time.

We feel that a study of the supplement, together with a viewing of the film "Reproductive Disorders in Cattle," which Messrs. Bayer Products have kindly loaned to the Association, and attendance at the demonstrations which are being arranged, should materially assist those practitioners and others who may not be sufficiently familiar with the application of the techniques required successfully to implement the methods suggested.*

Shortly, we hope to be in a position to announce that arrangements have been completed for members to receive such "refresher" instruction in their own practices, and it is suggested that a careful perusal of this week's supplement will facilitate the task of those chosen to give, and those desirous of receiving, tuition.

It will be noted that other matter has been excluded from this week's supplement in order that it may serve as a useful brochure for future reference.

*We understand that arrangements are being made which will enable members of the Association to acquire, at a special charge, the apparatus necessary for carrying out the recommended techniques.

CONTROL OF DISEASES OF FARM LIVESTOCK

In its issue of April 29th, *The Farmer and Stock-breeder* welcomes the activities of the Survey Committee of the N.V.M.A., in the above connection, in the following leading article:—

"Good work has been done by the Survey Committee of the National Veterinary Medical Association by its report on the diseases of farm livestock. With the object behind the committee's proposals there will be general agreement. Regarding the extent of the proposals and the methods of putting them into effect there may not be entire unanimity, but the thanks of the livestock industry are due to the Association.

"The report points out that it is the veterinary practitioners' duty not only to cure disease but to check the spread and eradicate it. It is for the veterinary profession to decide the methods that should be employed to accomplish the object, but there are points which breeders and owners must decide.

"These include the scope of the scheme—whether it should go to the full extent recommended by the profession or something smaller but useful—whether the scheme should be voluntary or compulsory, the means of meeting the cost, and so on. At present there appears to be little doubt that the stock-breeders' view is that it should be tried out on a voluntary basis at least at first, and let experience guide the future course.

"Then there is the question of control; but the veterinary profession has indicated its willingness to co-operate with breeders, and everything can be settled by a spirit of good will.

"This will not be secured by any body arrogating to itself the authority of speaking for all stock-breeders, as apparently the N.F.U. would do. Practical livestock knowledge is not restricted to one organisation. Some of it, at all events, reposes in the breed societies, which have led in the commercial cattle development that is here the aim.

"It might hastily be surmised that this is not a time at which action need be taken to deal with such things as mastitis, contagious abortion, sterility and Johne's disease. But some stock owners would enlarge the list.

"It is difficult to say which is the most serious, but contagious abortion and the sterility to which it often gives rise impose a heavy toll on stock-breeding and in these times are wasteful. They and other diseases are matters of urgency and anything that can be done to mitigate the evils brings an increase in food supply, and thus demands immediate effort just as much as ploughing-up."

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WAR DAMAGE INSURANCE

In our issue of April 26th we gave a résumé of the provisions of the War Damage (Business Scheme) Order, 1941, made by the Board of Trade under Part II of the War Damage Act, which became operative on April 17th, and stated that members should seek advice and insurance either from the insurance agent through whom their ordinary fire business is placed, or from the Insurance Brokers and Advisers to the N.V.M.A., Messrs. S. H. Cannon & Co., Ltd., War Damage Department, 24, Oaklands, Argyle Road, London, W.13.

We would now remind members that the days of grace allowed for taking out policies of insurance end on May 16th, and that persons who do not insure by that date will be covered only from the date on which their application with premium is received. Unless they have insured they will not be entitled to compensation for war damage to property insurable under the scheme.

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PERSONAL

DUBLIN COLLEGE STAFF PRESENTATION TO PROFESSOR O'CONNOR

On April 25th the members of the staff of the Royal Veterinary College, Ballsbridge, Dublin, presented their former Principal, Professor J. J. O'Connor, M.R.C.V.S.,

with his portrait in oils, as a token of their esteem and good wishes on his retirement.

Professor O'Connor has been associated with the College since its foundation in 1902.

Professor T. G. Browne (the new Principal), in making the presentation on behalf of the staff, said:—

"We have met here for a purpose which, in one sense, is very pleasant, but in every other sense it is most unpleasant, because it means parting with Professor O'Connor as our colleague on the staff. Furthermore, it means severing the last link with the foundation of the College, since Professor O'Connor has been a member of this staff from 1902, soon after the College came into being 40 years ago. He has seen the College, in its early days, grow up through many difficulties and trials, when its financial position was by no means sound, that is, before it was taken over by the Department of Agriculture in 1914. He has played a very important part in raising the College to that position of prosperity in which we see it to-day.

"I have been associated with Professor O'Connor for the past 31 years, first as his student, then for the remainder of that time as his colleague, and our relationship during that long period has been always most harmonious. We have never had the slightest difference in any way and I think the same can be said for the relationship between Professor O'Connor and every other member of the staff. He has always had that happy knack of getting on the right side of everyone and this faculty was, at least to some extent, responsible for his success as a colleague and as a teacher.

"We are not here to say good-bye to Professor O'Connor because we hope to see him frequently and we know that he will continue to take a profound interest in us, particularly since we are fortunate in having with us, as a colleague, his son, who is an admirable chip from the old block and whose presence amongst us will always make us feel that if we have not Professor O'Connor with us in person we shall always have him, at least, in spirit. The position of any of us is only temporary and the day must come sooner or later when we have got to give up. When that day comes some of us may feel tired and weary and glad that our labours are finished, but others like Professor O'Connor may feel as young and active and as capable of carrying on as ever.

"Judging by Professor O'Connor's youthful appearance he has still many years of active life before him. However, a Government Department must draw a hard and fast line in these matters, because it cannot take upon itself the responsibility of deciding just when a man is unable to carry on any longer. This question can be decided only by the age-limit and that, of course, falls harder on those who, like Professor O'Connor, still retain the vivacity of youth.

"On behalf of my colleagues and myself I ask you, Professor O'Connor, to accept this small gift as a token to you and Mrs. O'Connor of our esteem and remembrance, and I ask you not to regard its intrinsic value as being, in any way, a measure of the good will we wish to convey. We all wish you many happy days of active life to enhance still further your reputation in another sphere."

Thanking the staff for their kindness, Professor O'Connor spoke of the happy conditions under which he had worked and the sadness of parting from them officially.

Mr. P. E. Mullaney, Lecturer in Pathology, commented on Professor O'Connor's international reputation and described how on one occasion a visitor to Berlin met Professor Mueller and mentioned Professor O'Connor's name, whereat the well-known German professor gave him a present for "O'Connor of Dublin."

As a former student and assistant of Professor O'Connor, Professor M. J. Byrne, Professor of Surgery in place of the former Principal, associated himself with the tributes paid to Professor O'Connor.

The presentation was attended by the College staff, with the exception of Professor J. A. Nicholson, Mr. J. Kavanagh, Registrar, and Mr. J. Jones, on whose behalf apologies for non-attendance were sent.

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Birth.—On April 22nd, 1941, at Liverpool Maternity Hospital, to Leonora, wife of J. C. Baird, B.V.Sc., M.R.C.V.S., a daughter.

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Marriages.—Scott—Greenhill.—On April 24th, at St. Mary's Church, Bridgwater, Somerset, by the Vicar, Preb. E. Hughes-Davies, Charles Edward Stuart Scott, only son of Dr. W. M. Scott and the late Mrs. Scott, of Fryern Hall, Bridgwater, to Jocelyne Lucy Greenhill, youngest daughter of Captain C. B. Greenhill and Mrs. Greenhill, of Puriton.

The father of the bride, who is Chairman of the Bridgwater County Bench of Magistrates, is now a Pilot Officer in the R.A.F., and a number of representatives of the Air Force acted as ushers to the congregation, who numbered between 700 and 800.

Stephens—Anderson.—On April 19th, at St. John's Church, Frome, Trevor Kingdon Stephens, M.R.C.V.S., Garston House, Frome, to Jean Ray Anderson, Arden Road, Finchley.

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War Office Appointments.—After a brief period of service as Veterinary Officer, Tanganyika Territory, Mr. Ronald Richard Temple, M.R.C.V.S., of Mill Hill, who qualified from the London College in December, 1939, joined the King's African Rifles. We are pleased to learn that he has now been granted his commission, and is serving as Assistant Veterinary Officer to the Corps.

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Mr. David John Anthony, M.R.C.V.S., D.V.S.M. (Vict.), (Lt., T.A. Reserve), has been appointed Lieut.-Colonel and Battalion Commander (Home Guard).

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R.C.V.S. OBITUARY

Holness, Harold James, D.S.O., Colonel R.A.V.C. (retd.). At the Cottage, Great Finborough, near Stowmarket. Graduated London September 22nd, 1903. Died April 30th, 1941.

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LEGAL NOTES

Doping of Greyhounds.—Found guilty at the Central Criminal Court, on Monday last, of conspiring to administer drugs to certain greyhounds, with intent to defraud such persons as might be induced to wager on the dogs, Louis Hoeltschi, 54, described as a labourer, was sentenced to eight months' imprisonment. Six youths pleaded "Guilty" to the same charge. George Constant, 16½; James Edward Atkinson, 16, kennel boy, and Leonard Collins, 18, metal worker, were each bound over for three years. Judgment on Robert William Norris, 18, labourer; Patrick Gallagher, 19, labourer, and Malcolm Routledge, 19, labourer, was postponed until the next session. Hoeltschi was found not guilty of conspiring to administer injurious drugs, and on this count he was acquitted.

Frank William Clark, trainer at the Crayford and Bexley Heath Greyhound Stadium, in evidence, said he cancelled a hurdle event on March 8th because three of the five dogs were unfit to race. They were in a dazed condition and semi-paralysed. They were valuable animals. One of the dogs had since been destroyed; another had lost 15 lb. weight, and was not likely to race again, and it would be a considerable time before the other dog would be able to race again.

The Common Serjeant (Mr. Cecil Whiteley, K.C.) said that one thing had been achieved by the prosecution—that the public, especially those connected with greyhounds, now knew that it was a criminal offence for anyone to meddle with greyhounds. If convicted they could be sentenced to two years' imprisonment.

DOGS FOR THE ARMY

The War Office invites dog owners to lend their dogs to the Army. The breeds most suitable are Airedales, Collies (rough or smooth), Hill Collies, Crossbreds, Lurchers, and Retrievers (Labrador or Golden), although intelligence and natural ability will be the deciding factors in selection.

Dogs offered will be given an intensive course of training. Those not passing the test will be immediately returned to the owners; selected dogs will be retained for the duration of the war. Owners can have every confidence that their dogs will receive skilled care and attention.

The War Dog Training School is at Willems Barracks, Aldershot, to which offers of dogs should be made by letter.

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ROYAL VETERINARY COLLEGE R.F.C.

We are pleased to learn that the Royal Veterinary College Rugby Football Club has had an outstandingly successful season at its new Berkshire home. Mr. Duncan Sheriff, the Hon. Secretary, writes: "The Club fixtures included Army, R.A.F., Oxford Medicals and Reading University teams, but owing to war-time difficulties we could not play our usual matches with Dublin and Edinburgh Veterinary College Clubs. Of 15 matches played we won 13 and drew 2, scoring 304 points to 33 against.

"The encouragement given by our supporters, particularly the President of the Club, Professor Wooldridge, was very much appreciated."

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The Council of the British Medical Association has approved a proposal to recommend general practitioners to increase their private fees, including contract fees, by not less than 20 per cent.

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At the quarterly meeting of the Council of the Royal College of Surgeons of England, with Sir Hugh Lett, President, in the chair, the Walker Prize for Cancer Research was awarded to Dr. Peyton Rous, of the Rockefeller Institute, New York.

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Fines totalling £140, with £10 10s. 0d. advocate's fee, were imposed at Malmesbury (Wilts.) on three farmers and a haulier for offences concerning the movement of cattle under the Diseases of Animals Acts. The offences were disclosed by police inquiries into the movement of cattle following outbreaks of foot-and-mouth disease on the premises of two of the defendants last December.

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Major Miller Mundy was re-elected President of the British Dairy Farmers' Association at the recently held annual meeting. The accounts showed a credit balance on the year's working of £302.

CORRESPONDENCE

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

Correspondents submitting letters for anonymous insertion must forward their names and addresses for the information of the Editor; otherwise their communications will not receive consideration.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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THE CONTROL OF DISEASES OF FARM LIVESTOCK

TO THE EDITOR OF THE VETERINARY RECORD

Sir,—After reading the Report of the Survey Committee of the N.V.M.A., and after listening to a discussion on it, at the last meeting of the Southern Counties Division at Salisbury, I have formed the opinion, rightly or wrongly, that its main object is not so much the treatment as the control, and perhaps ultimate eradication, of diseases of farm livestock.

This opinion seems to be shared by clients who have read its gist in their agricultural papers.

An old adage states that: "Any fool can treat a case, but that it requires a wise man to diagnose it." Those who seek to embark upon the field of prevention and with it, control, will fall into the former category if they pin their faith to treating clinical cases and ignore the necessity of laboratory co-operation.

It may be waste of time to await the result of a laboratory examination before proceeding with udder infusion in obvious cases of mastitis. It will certainly prove to be futile to expect control and eradication, unless the quarterly inspection is accompanied by a sample of the milk from the cows examined.

When contagious abortion appears in a herd (and let it be remarked that, in not a few cases, the earliest warning before actual abortion occurs is an increase in the incidence of retained placentae in cows and heifers going to full-term pregnancy) it is futile to advise on what measures to adopt, until the agglutination test is made on all in it, and so the degree of infection existing is determined. Such will prove to be the case with mastitis, and future immunity can only be maintained by the assistance of a laboratory.

One and all seem to agree that a dead vaccine is of very little value and that the living vaccine can alone be expected to *control*, whilst not *eradicating* the disease. But vaccination of any sort should only be adopted when other measures are impossible, for once vaccination starts there is no end to it, if continued protection is to be expected from its use. The surest and quickest way to eradicate abortion in a herd is to dispose of the positives and to carry out periodical agglutination testing.

The majority of those who deal with cases of sterility will agree that by far the commonest cause is an endometritis of varying degree; and are prepared to doubt the assertion, unless it is restricted to functional sterility, that it is a physiological derangement of the reproductive system.

It would be a practical proposition to control Johne's disease by testing with a johnin of proved potency and efficiency, and so detect those still in the so-called "dry stage," if such a product existed. Suffice it to say that at present it does not.

For all practical purposes the double intradermal tuberculin test is the most reliable so far introduced, provided it is properly carried out and its interpretation left in the hands of the person conducting it, and who bases an opinion, not on the measurements, but on the nature of the swelling which follows the injection of the tuberculin.

The new Weybridge tuberculin may not be the perfect product, but it is certainly a distinct improvement on any of its predecessors, and produces more clearly defined swellings.

A query has arisen, in these columns, as to why it is that negatives to pre-Weybridge tuberculin, now shown to be positive following its use, have not in the interim developed some clinical form of tuberculosis. In the first place, one must allow for the fact that the infection may only have occurred in this interim; and in the second it ought to be known that, although an animal may be tuberculous, it may never show any clinical evidence of the disease or die from its effects.

It has been brought forward in condemnation of the test, that a cow which had given a so-called "doubtful" reaction, on *post-mortem* examination only showed a "healed" lesion in the lung. On what grounds was it considered that this lesion was "healed"—macroscopic appearance or careful microscopical examination? On the facts submitted, the efficacy of the test does not seem to be impaired.

A cow which was reported as having a tuberculous cough and which was not "taken under the Order," was later found by the veterinary surgeon who reported it to be rotten with the disease. Having had somewhat similar

experiences in the past, I know that in the absence of definite clinical symptoms such as pathological emaciation, etc., unless acid-fast bacilli can be demonstrated in the sputum, no action can be expected no matter what a subsequent *post-mortem* examination may reveal.

It is always easy to form an opinion after a *post-mortem* examination. It is less easy to arrive at one which a subsequent *post-mortem* examination will confirm. Not a few cows in an advanced stage of emaciation, accompanied by a chronic cough which nearly takes the roof off the byre, and whose lungs on auscultation have wheezes which beat an organ never tuned, will on *post-mortem* examination only show chronic emphysema of the lungs. A *post-mortem* examination should only be regarded as a confirmation of a *prima facie* opinion, arrived at before death, or slaughter.

Yours faithfully,
J. F. D. Tutt.

"Rothiemurchus,"
St. Cross,
Winchester.

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FOETAL ABNORMALITIES

To the Editor of the Veterinary Record

Sir,—It is with interest that I have read of the experiences of Messrs. Smythe and Robertson in regard to calves that are literally "inside out" *in utero*. It seems peculiar that in a practice adjoining that mentioned by Mr. Robertson I myself, during the last 20 years, have come across quite a number of similar cases. I relate my experiences principally as a guide to younger practitioners or students.

In such presentations as Messrs. Smythe and Robertson have recorded I have either managed to get a rope around or beyond the inverted spine, and effected delivery by traction (when the foetuses have been small enough), or have passed a piece of Bowden wire in the same position and sawn the foetus in halves, and drawn the calf in two pieces.

A more difficult presentation has been when all four legs and the head have been presented at the same time. On the first occasion that I met this I thought that I had got two calves and I tried to get first the one that was coming forward and then the one that was coming backwards, but of course found that the more I pulled on one the more the other jammed. I would mention here that in all the cases that I have met (probably 10 to 12) there has been ankylosis of the whole of the vertebrae. This of course adds to the difficulties. In earlier days I have removed fore limbs to effect delivery. To-day I am the possessor of a Provost Embryotome and have used it on such a case only this week. I took off first the head, then the fore limbs, next the hind limbs and then had to divide the inverted spine. The cow had done well for four days, but a visit to-day finds swelling of the vulva with temperature 104° F.

With the risk of boring any readers I would record an experience and perhaps reply to the query as to whether the cow should be bulled again.

I was called to castrate an 11-months-old bull that had been "rejected" and used a Burdizzo. I had considerable difficulty in keeping the cord of the near testicle between the jaws and luckily told the owner that I was not sure that the operation was a complete success. In any case the animal was turned out with some heifers, two of which proved in calf. Both foetuses were of the type described. It appears that the condition may be due to defective spermatoza, due to injured cord and testicle.

Yours faithfully,
T. J. Margarson.

Camden House,
London Road,
Stroud, Glos.
April 27th, 1941.

DISEASES OF ANIMALS ACTS, 1894 to 1937, and AGRICULTURE ACT of 1937 (PART IV)

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 16th to 31st March, 1941	24	28*	61	5,497	1	3	13	48	30
Corresponding period in									
1940	31	32	1	124	2	2	9	131	83
1939	54	60	—	—	2	3	10	61	24
1938	44	48	10	499	5	7	7	14	19
Total 1st January to 31st March 1941	136	148	176	17,474	6	15	92	554	263
Corresponding period in									
1940	160	173	15	2,366	10	22	91	920	524
1939	262	280	29	4,357	19	36	139	338	196
1938	259	270	113	15,158	32	49	82	96	

Note.—The figures for the current year are approximate only. §Excluding outbreaks in Army Horses.
*3 of these animals refer to an outbreak confirmed prior to March 16th, 1941.

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from tuberculosis, as at March 31st, 1941, was as follows:— England 3,866 ... Wales 9,284 ... Scotland 3,261 ... Total (Great Britain) 16,411